

As far as we know, whether it is in HK, EU members, US or UK, the deliberate release of GMO (or synthetic microorganisms, SMO) is not allowed. In European countries and the US, only case-by-case approval allows the deliberate release of GMO.

How do you think, if our microbial biosensor design is:

- GMO is immobilised on a paper, which acts like a pH paper, for IN-FIELD, e.g. soil, use (operated by farmers or mariculturists)?
- GMO is immobilised in a sensing part of a biosensor, which looks like a thermometer or pregnancy test device, for IN-FIELD, e.g. soil and water, use (operated by farmers or mariculturists)?

How do you think, if our microbial biosensor is not placed in the soil or floating on the sea:

- Farmers or mariculturists pick up a portion of soil or water samples, then insert the device in their sample without contacting the original source of the sample. However, the usage is OUT-OF-LABORATORY, is it an appropriate use?

Are the above THREE situations violating HK laws and ordinances if the application of genetically-modified-microbial biosensor is not approved by HKSAR and AFCD?

Policy-making

1. To what extent do you believe that the current policies and regulations regarding the use of GMO are sufficient in limiting the containment of GMO into the environment?
2. To what extent do you believe that the current policies and regulations regarding the use of GMO limit the development in the area of biosensors/ biotechnology in HK?
3. How can/should one prove in a biological system, where the systems are inheritably difficult to predict, that a "contained system" (eg. paper based cell system) would not impact the surrounding environment? Especially in the long term?
4. What are the most common types/ examples of GMO for which approval of release is received (by the government)?
5. What are the requirements for obtaining approval of GMO release?
6. Are there any previous examples of unapproved GMO release into the environment in Hong Kong?
7. In the case that a GMO is released into the environment, what are the measurements/ procedure to be taken by the government?
8. Are there any specific policies regarding the release of solely DNA into the environment (without the bacteria contained) i.e. the release of genetically modified plasmid? Or are the policies on "genetically modified" only applied at the "organism" level?

With the possible environmental risks associated with cell-based biosensors, does it deter you in any way from supporting advancement in this field? and promote advancement in other areas of technology for sensing of materials, molecules eg. chemical based? or do you think that there should be advancement research for preventing containment into the environment, limiting their

possible risks?

9. Based on your experience, do you think that there will be an increasing trend for the use of GMO products (biosensing, agricultural, new energy, etc) in HK? why or why not?

10. What do you believe are the possible effects/problems that may arise if there is an increasing use of GMO in HK? What could be the possible advantage brought?

In Hong Kong, the Genetically Modified Organisms (Control of Release) Ordinance, Cap. 607, (the Ordinance) controls the release into the environment and the transboundary movement of living genetically modified organisms (GMOs). According to the Ordinance, no one is allowed to release a GMO into the environment, import a GMO intended for release into the environment or maintain the life of a GMO that is in a state of being released into the environment, unless if the GMO has been approved for release, or if it has been exempted from the control of the Ordinance.

On the other hand, laboratory GMOs, such as transgenic zebrafish or GM micro-organisms for researches may be regarded as **contained uses** of GMOs if the research is undertaken within a facility, installation or other physical barrier and the GMOs are controlled by specific measures that effectively limit its contact with, and its impact on, the environment. Under the Ordinance, it is not required to apply for approval for the uses, imports or exports of GMOs intended for contained uses in Hong Kong. However, if an GMO that has not been approved or exempted was released into the environment, the person who has control of the GMO have to inform the Director of Agriculture, Fisheries and Conservation of the release with information required by the Ordinance. In addition, shipments of GMOs intended for contained use, when being imported or exported, must be accompanied with prescribed documents in order to fulfill the documentation requirements under the Ordinance.

The Genetically Modified Organisms (Control of Release) Ordinance, Cap. 607, (the Ordinance) controls the release into the environment of living genetically modified organisms (GMOs) and their transboundary movements in Hong Kong. Under the Ordinance, nobody are allowed to knowingly release living GMO into the environment unless if the GMO has been approved for release, or if it has been exempted from the controls of the Ordinance.

Although the uses, imports or exports of GMOs intended for **contained uses** in Hong Kong do not required to apply for approval, the uses of these GMOs have to be confined within a facility, installation or other physical barrier, and there specific measures that effectively limit the contact of the GMOs with, and their impacts on the environment. On the contrary, exposing GMOs in an environment where they may grow, reproduce, get in contact with and impact on other organisms, including but not limited to the transfer of genetic material to other organism, may be considered as environmental release which require prior approval from the Director of Agriculture, Fisheries and Conservation(DAFC). Finally, if the unapproved or unexempted GMOs are released into the environment, the person who has control of the GMOs have to inform DAFC of the release with information required by the Ordinance.

You are welcome to visit our online Genetically Modified Organisms Register (http://www.afcd.gov.hk/english/conservation/con_gmo/con_gmo.html) regarding the controls of the Ordinance and the requirements for obtaining an approval for environmental release of GMO. You may also contact me at 2150-6918 for further information.

2015 iGEM HKUST-Rice Team Human Practices

The Exploratory Research on the Study of Stakeholders' Perceptions towards the In-field Use of NPK Microbial Biosensor

Interview Transcript

Details of the controls of the Ordinance and the documentation requirements for imports and exports can be found at the online Genetically Modified Organisms Register at http://www.afcd.gov.hk/english/conservation/con_gmo/con_gmo.html. You are also welcome to email to biosafety@afcd.gov.hk or call 2150 6918 for relevant information.